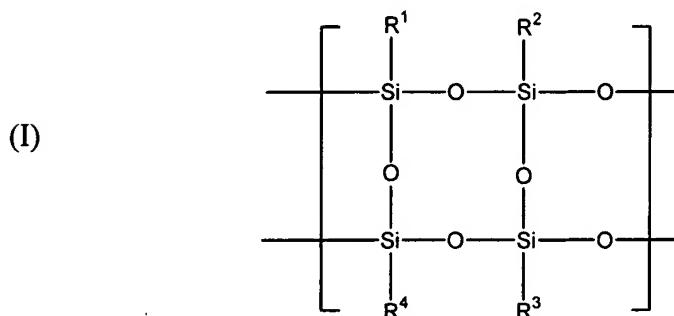


The following listing of the claims will replace all prior versions, and listings, of claims in the application:

**LISTING OF THE CLAIMS**

Claims 1-66 (Canceled)

67. (Previously presented) A fluorinated silsesquioxane polymer comprised of monomer units having the structure (I)



wherein:

R<sup>1</sup>, R<sup>2</sup>, R<sup>3</sup> and R<sup>4</sup> are independently selected from the group consisting of substituents having the structure of formula -(Q)<sub>n</sub>-CR<sup>7</sup>R<sup>8</sup>R<sup>9</sup>;

n is zero or 1;

Q is selected from the group consisting of arylene, substituted arylene, alkarylene, substituted alkarylene, and C<sub>1</sub>-C<sub>4</sub> alkylene optionally substituted with at least one nonhydrogen substituent selected from alkyl and fluoroalkyl;

R<sup>7</sup> is hydrogen;

R<sup>8</sup> is fluoroalkyl; and

R<sup>9</sup> is OH, COOH or an acid-cleavable moiety.

68-70. (Canceled)

71. (Previously presented) The polymer of claim 67, wherein n is 1 and Q is selected from the group consisting of arylene, fluorinated arylene, and C<sub>1</sub>-C<sub>4</sub> alkylene optionally substituted with 1-8 nonhydrogen substituents selected from alkyl and fluoroalkyl.

72. (Canceled)

73. (Previously presented) The polymer of claim 71, wherein Q is arylene or fluorinated arylene.

74. (Canceled)

75. (Previously presented) The polymer of claim 73, wherein Q is arylene.

76. (Previously presented) The polymer of claim 73, wherein Q is fluorinated arylene.

77-78. (Canceled)

79. (Previously presented) The polymer of claim 71, wherein Q is C<sub>1</sub>-C<sub>4</sub> alkylene optionally substituted with 1-8 nonhydrogen substituents selected from alkyl and fluoroalkyl.

80. (Previously presented) The polymer of claim 79, wherein Q is C<sub>1</sub>-C<sub>4</sub> alkylene optionally substituted with 1-8 nonhydrogen substituents selected from C<sub>1</sub>-C<sub>6</sub> alkyl and C<sub>1</sub>-C<sub>6</sub> fluoroalkyl.

81. (Previously presented) The polymer of claim 79, wherein Q is C<sub>1</sub>-C<sub>4</sub> alkylene optionally substituted with 1-8 nonhydrogen substituents selected from C<sub>1</sub>-C<sub>6</sub> alkyl, trifluoromethyl, and trifluoromethyl-substituted C<sub>1</sub>-C<sub>6</sub> alkyl.

82-83. (Canceled)

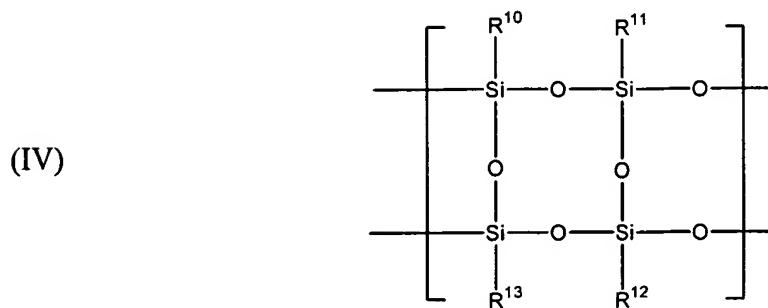
84. (Previously presented) The polymer of claim 67, wherein R<sup>8</sup> is C<sub>1</sub>-C<sub>6</sub> fluoroalkyl.

85. (Previously presented) The polymer of claim 84, wherein R<sup>8</sup> is trifluoromethyl-substituted C<sub>1</sub>-C<sub>6</sub> alkyl.
86. (Previously presented) The polymer of claim 67, wherein R<sup>9</sup> is OH.
87. (Previously presented) The polymer of claim 67, wherein R<sup>9</sup> is COOH.
88. (Previously presented) The polymer of claim 67, wherein R<sup>9</sup> is an acid-cleavable moiety.
89. (Previously presented) The polymer of claim 88, wherein the acid-cleavable moiety is an acid-cleavable ester, ether or carbonate.
90. (Previously presented) The polymer of claim 89, wherein R<sup>9</sup> is an acid-cleavable ester.
91. (Previously presented) The polymer of claim 90, wherein R<sup>9</sup> has the formula -(L)<sub>v</sub>-(CO)-OR<sup>14</sup> wherein v is zero or 1, L is a linking group, and R<sup>14</sup> is selected from the group consisting of acyclic tertiary alkyl moieties, cyclic substituents with a tertiary attachment point, and 2-trialkylsilyl-ethyl moieties.
92. (Previously presented) The polymer of claim 91, wherein v is zero and R<sup>14</sup> is acyclic tertiary alkyl.
93. (Previously presented) The polymer of claim 92, wherein R<sup>14</sup> is *t*-butyl.
94. (Previously presented) The polymer of claim 91, wherein v is zero and R<sup>14</sup> is a cyclic substituent with a tertiary attachment point.
95. (Previously presented) The polymer of claim 94, wherein R<sup>14</sup> is selected from the group consisting of adamantyl, norbornyl, isobornyl, 2-methyl-2-adamantyl, 2-methyl-2-isobornyl, 2-butyl-2-adamantyl, 2-propyl-2-isobornyl, 2-methyl-2-tetracyclododecanyl, 2-methyl-2-dihydrodicyclopentadienyl-cyclohexyl, 1-methylcyclopentyl, and 1-methylcyclohexyl.

96. (Previously presented) The polymer of claim 91, wherein v is zero and R<sup>14</sup> is 2-trialkylsilyl ethyl.

97. (Previously presented) The polymer of claim 96, wherein R<sup>14</sup> is 2-trimethylsilyl ethyl.

98. (Previously presented) The polymer of claim 67, further comprising additional monomer units having the structure of formula (IV)



wherein R<sup>10</sup>, R<sup>11</sup>, R<sup>12</sup> and R<sup>13</sup> are independently hydrogen, alkyl, fluoroalkyl, fluorocarbinol or an acid-cleavable moiety, with the proviso that at least one of R<sup>10</sup>, R<sup>11</sup>, R<sup>12</sup> and R<sup>13</sup> is an acid-cleavable moiety.

99. (Previously presented) The polymer of claim 98, wherein R<sup>10</sup>, R<sup>11</sup>, R<sup>12</sup> and R<sup>13</sup> are independently hydrogen, alkyl, or the acid-cleavable moiety, and the acid-cleavable moiety is selected from the group consisting of acid-cleavable esters, ethers, and carbonates.

100. (Previously presented) The polymer of claim 99, wherein at least one of R<sup>10</sup>, R<sup>11</sup>, R<sup>12</sup> and R<sup>13</sup> is an acid-cleavable ester.

101. (Previously presented) A lithographic photoresist composition comprising the fluorinated silsesquioxane polymer of claim 67 and a radiation-sensitive acid generator.

102. (Previously presented) A lithographic photoresist composition comprising the fluorinated silsesquioxane polymer of claim 98 and a radiation-sensitive acid generator.

103. (Previously presented) The lithographic photoresist composition of claim 101, wherein the photoresist composition is a positive resist and further comprises a photoacid-cleavable dissolution inhibitor.

104. (Previously presented) The lithographic photoresist composition of claim 102, wherein the photoresist composition is a positive resist and further comprises a photoacid-cleavable dissolution inhibitor.

105. (Previously presented) The lithographic photoresist composition of claim 101, wherein the photoresist composition is a negative resist and further comprises a crosslinking agent.

106. (Previously presented) The lithographic photoresist composition of claim 102, wherein the photoresist composition is a negative resist and further comprises a crosslinking agent.

107. (Previously presented) The lithographic photoresist composition of claim 105, wherein the crosslinking agent is a glycoluril compound.

108. (Previously presented) The lithographic photoresist composition of claim 107, wherein the glycoluril compound is selected from the group consisting of tetramethoxymethyl glycoluril, methylpropyltetramethoxymethyl glycoluril, methylphenyltetramethoxymethyl glycoluril, and mixtures thereof.

109. (Previously presented) The lithographic photoresist composition of claim 106, wherein the crosslinking agent is a glycoluril compound.

110. (Previously presented) The lithographic photoresist composition of claim 109, wherein the glycoluril compound is selected from the group consisting of tetramethoxymethyl glycoluril,

methylpropyltetramethoxymethyl glycoluril, methylphenyltetramethoxymethyl glycoluril, and mixtures thereof.

111. (Withdrawn) A process for generating a resist image on a substrate, comprising the steps of:

- (a) coating a substrate with a film of the photoresist composition of claim 101;
- (b) exposing the film selectively to a predetermined pattern of deep ultraviolet radiation so as to form a latent, patterned image in the film; and
- (c) developing the latent image with a developer.

112. (Withdrawn) The process of claim 111, wherein the deep ultraviolet radiation has a wavelength of less than 250 nm.

113. (Withdrawn) The process of claim 112, wherein the deep ultraviolet radiation has a wavelength of 157 nm.

114. (Withdrawn) The process of claim 111, wherein the substrate is a bilayer substrate comprising a base layer covered by an underlayer and the photoresist composition covers the underlayer.

115. (Withdrawn) A process for generating a resist image on a substrate, comprising the steps of:

- (a) coating a substrate with a film of the photoresist composition of claim 102;
- (b) exposing the film selectively to a predetermined pattern of deep ultraviolet radiation so as to form a latent, patterned image in the film; and
- (c) developing the latent image with a developer.

116. (Withdrawn) The process of claim 115, wherein the deep ultraviolet radiation has a wavelength of less than 250 nm.

117. (Withdrawn) The process of claim 116, wherein the deep ultraviolet radiation has a wavelength of 157 nm.

118. (Withdrawn) The process of claim 115, wherein the substrate is a bilayer substrate comprising a base layer covered by an underlayer and the photoresist composition covers the underlayer.

119. (Withdrawn) A method of forming a patterned material structure on a substrate, comprising:

- (a) providing a substrate comprised of a material selected from the group consisting of semiconductors, ceramics and metals;
- (b) applying a layer of the photoresist composition of claim 103 to the substrate;
- (c) patternwise exposing the substrate to radiation whereby acid is generated by the radiation-sensitive acid generator in exposed regions of the photoresist layer;
- (d) contacting the substrate with an aqueous alkaline developer solution, whereby the exposed regions of the photoresist layer are selectively dissolved by the developer solution to reveal a resist structure pattern; and
- (e) transferring the resist structure pattern to the substrate by etching into the substrate through spaces in the resist structure pattern.

120. (Withdrawn) The process of claim 119, wherein the radiation is deep ultraviolet radiation.

121. (Withdrawn) A method of forming a patterned material structure on a substrate, comprising:

- (a) providing a substrate comprised of a material selected from the group consisting of semiconductors, ceramics and metals;
- (b) applying a layer of the photoresist composition of claim 104 to the substrate;
- (c) patternwise exposing the substrate to radiation whereby acid is generated by the radiation-sensitive acid generator in exposed regions of the photoresist layer;
- (d) contacting the substrate with an aqueous alkaline developer solution,

whereby the exposed regions of the photoresist layer are selectively dissolved by the developer solution to reveal a resist structure pattern; and

(e) transferring the resist structure pattern to the substrate by etching into the substrate through spaces in the resist structure pattern.

122. (Withdrawn) The process of claim 119, wherein the radiation is deep ultraviolet radiation.

123. (Withdrawn) A method of forming a patterned material structure on a substrate, comprising:

- (a) providing a substrate comprised of a material selected from the group consisting of semiconductors, ceramics and metals;
- (b) applying a layer of the photoresist composition of claim 105 to the substrate
- (c) patternwise exposing the substrate to radiation whereby acid is generated by the radiation-sensitive acid generator in exposed regions of the photoresist layer thereby inducing crosslinking;
- (d) contacting the substrate with an aqueous alkaline developer solution, whereby the unexposed regions of the photoresist layer are selectively dissolved by the developer solution to reveal a negative resist structure pattern; and
- (e) transferring the negative resist structure pattern to the substrate by etching into the substrate through spaces in the negative resist structure pattern.

124. (Withdrawn) A method of forming a patterned material structure on a substrate, comprising:

- (a) providing a substrate comprised of a material selected from the group consisting of semiconductors, ceramics and metals;
- (b) applying a layer of the photoresist composition of claim 106 to the substrate
- (c) patternwise exposing the substrate to radiation whereby acid is generated by the radiation-sensitive acid generator in exposed regions of the photoresist layer thereby inducing crosslinking;
- (d) contacting the substrate with an aqueous alkaline developer solution, whereby the unexposed regions of the photoresist layer are selectively dissolved by the developer solution to reveal a negative resist structure pattern; and

(e) transferring the negative resist structure pattern to the substrate by etching into the substrate through spaces in the negative resist structure pattern.

125. (Previously presented) The polymer of claim 81, wherein Q is C<sub>1</sub>-C<sub>4</sub> alkylene.

126. (Previously presented) The polymer of claim 84, wherein R<sup>8</sup> is trifluoromethyl.

127. (Previously presented) The polymer of claim 91, wherein v is 1 and L is selected from: linear, branched, and cyclic alkylene; linear, branched, and cyclic fluoroalkylene; and arylene.

128. (Previously presented) The polymer of claim 100, wherein the acid-cleavable ester has the formula -(L)<sub>v</sub>-(CO)-OR<sup>14</sup> wherein v is zero or 1, L is a linking group, and R<sup>14</sup> is selected from the group consisting of acyclic tertiary alkyl moieties, cyclic substituents with a tertiary attachment point, and 2-trialkylsilyl ethyl moieties.

129. (Previously presented) The polymer of claim 128, wherein v is 1 and L is selected from: linear, branched, and cyclic alkylene; linear, branched, and cyclic fluoroalkylene; and arylene.

130. (Previously presented) The polymer of claim 129, wherein L is selected from linear, branched, and cyclic alkylene.

131. (Previously presented) The polymer of 130, wherein L is cyclic alkylene.

132. (Previously presented) The polymer of claim 131, wherein L is a norbornyl or cyclohexyl group.

133. (Previously presented) The polymer of claim 132, wherein L is norbornyl.

134. (Previously presented) The polymer of claim 131, wherein R<sup>14</sup> is acyclic tertiary alkyl.

135. (Previously presented) The polymer of claim 132, wherein R<sup>14</sup> is acyclic tertiary alkyl.

136. (Previously presented) The polymer of claim 133, wherein R<sup>14</sup> is acyclic tertiary alkyl.

137. (Previously presented) The polymer of claim 134, wherein R<sup>14</sup> is *t*-butyl.

138. (Previously presented) The polymer of claim 135, wherein R<sup>14</sup> is *t*-butyl.

139. (Previously presented) The polymer of claim 136, wherein R<sup>14</sup> is *t*-butyl.

140. (Previously presented) The polymer of claim 131 wherein R<sup>14</sup> is a cyclic substituent with a tertiary attachment point.

141. (Previously presented) The polymer of claim 132, wherein R<sup>14</sup> is a cyclic substituent with a tertiary attachment point.

142. (Previously presented) The polymer of claim 133, wherein R<sup>14</sup> is a cyclic substituent with a tertiary attachment point.

143. (Previously presented) The polymer of claim 140, wherein R<sup>14</sup> is selected from the group consisting of adamantyl, norbornyl, isobornyl, 2-methyl-2-adamantyl, 2-methyl-2-isobornyl, 2-butyl-2-adamantyl, 2-propyl-2-isobornyl, 2-methyl-2-tetracyclododeceny, 2-methyl-2-dihydrodicyclopentadienyl-cyclohexyl, 1-methylcyclopentyl, and 1-methylcyclohexyl.

144. (Previously presented) The polymer of claim 141, wherein R<sup>14</sup> is selected from the group consisting of adamantyl, norbornyl, isobornyl, 2-methyl-2-adamantyl, 2-methyl-2-isobornyl, 2-butyl-2-adamantyl, 2-propyl-2-isobornyl, 2-methyl-2-tetracyclododeceny, 2-methyl-2-dihydrodicyclopentadienyl-cyclohexyl, 1-methylcyclopentyl, and 1-methylcyclohexyl.

145. (Previously presented) The polymer of claim 144, wherein R<sup>14</sup> is selected from the group consisting of adamantyl, norbornyl, isobornyl, 2-methyl-2-adamantyl, 2-methyl-2-isobornyl, 2-

butyl-2-adamantyl, 2-propyl-2-isobornyl, 2-methyl-2-tetracyclododecenyl, 2-methyl-2-dihydrodicyclopentadienyl-cyclohexyl, 1-methylcyclopentyl, and 1-methylcyclohexyl.

146. (Previously presented) The polymer of claim 131, wherein R<sup>14</sup> is 2-trialkylsilyleethyl.

147. (Previously presented) The polymer of claim 132, wherein R<sup>14</sup> is 2-trialkylsilyleethyl.

148. (Previously presented) The polymer of claim 133, wherein R<sup>14</sup> is 2-trialkylsilyleethyl.

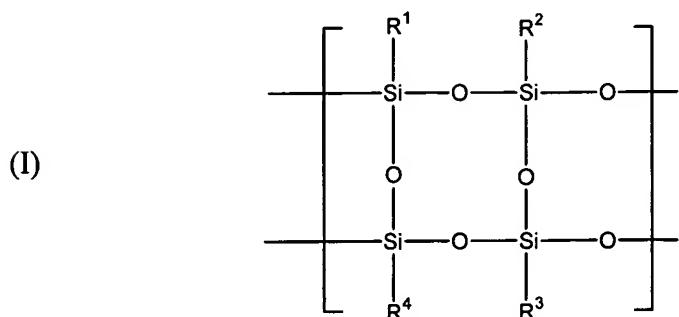
149. (Previously presented) The polymer of claim 131, wherein R<sup>14</sup> is 2-trialkylsilyleethyl.

150. (Previously presented) The polymer of claim 147, wherein R<sup>14</sup> is 2-trimethylsilyleethyl.

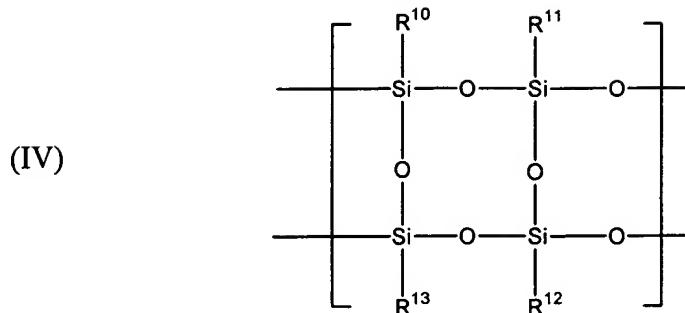
151. (Previously presented) The polymer of claim 148, wherein R<sup>14</sup> is 2-trimethylsilyleethyl.

152. (Previously presented) The polymer of claim 151, wherein R<sup>14</sup> is 2-trimethylsilyleethyl.

153. (Previously presented) A copolymer comprised of fluorinated silsesquioxane monomer units having the structure (I)



and silsesquioxane comonomer units having the structure (IV)



wherein:

$R^1$ ,  $R^2$ ,  $R^3$  and  $R^4$  are independently selected from substituents of the formula  $-Q-CHR^8R^9$ ;

$Q$  is  $C_1-C_4$  alkylene;

$R^8$  is  $C_1-C_6$  fluoroalkyl;

$R^9$  is OH or COOH;

$R^{10}$ ,  $R^{11}$ ,  $R^{12}$  and  $R^{13}$  are independently selected from the group consisting of hydrogen, alkyl, and acid-cleavable esters of the formula  $-L-(CO)-OR^{14}$ , with the proviso that at least one of  $R^{10}$ ,  $R^{11}$ ,  $R^{12}$  and  $R^{13}$  is an acid-cleavable ester of the formula  $-L-(CO)-OR^{14}$ ;

$L$  is a cycloalkylene linking group; and

$R^{14}$  is selected from the group consisting of acyclic tertiary alkyl moieties, cyclic substituents with a tertiary attachment point, and 2-trialkylsilyl ethyl moieties.

154. (Previously presented) The copolymer of claim 153, wherein:

$R^8$  is selected from trifluoromethyl and trifluoromethyl-substituted  $C_1-C_6$  alkyl; and

$R^9$  is OH.

155. (Previously presented) The copolymer of claim 154, wherein:

$R^8$  is trifluoromethyl;

$R^{14}$  is selected from the group consisting of *t*-butyl, adamantyl, norbornyl, isobornyl, 2-methyl-2-adamantyl, 2-methyl-2-isobornyl, 2-butyl-2-adamantyl, 2-propyl-2-isobornyl, 2-methyl-2-tetracyclododeceny, 2-methyl-2-dihydrodicyclopentadienyl-cyclohexyl, 1-methylcyclopentyl, 1-methylcyclohexyl, 2-trimethylsilyl ethyl, and 2-triethylsilyl ethyl.

156. (Previously presented) The copolymer of claim 155, wherein:

L is norbornyl; and

R<sup>14</sup> is *t*-butyl.

157. (Previously presented) A lithographic photoresist composition comprising the copolymer of claim 153 and a radiation-sensitive acid generator.

158. (Previously presented) The lithographic photoresist composition of claim 157, wherein the photoresist composition is a positive resist and further comprises a photoacid-cleavable dissolution inhibitor.

159. (Previously presented) The lithographic photoresist composition of claim 157, wherein the photoresist composition is a negative resist and further comprises a crosslinking agent.